M-AUDIO®

KEYSTATION 49e™ · 61es™ · 88 es™

USB MIDI Controller

USER GUIDE

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Introduction

Congratulations on purchasing an M-Audio Keystation keyboard. The Keystation line offers 49-, 61- and 88-note velocity-sensitive USB keyboards designed to easily integrate with your PC or Macintosh computer. The Keystation 61es and 88es offer semi-weighted keys that give you the feel of a piano in a compact, affordable MIDI controller. Ideal for a multitude of music creation and education applications, the Keystation line offers modulation and pitch bend wheels, plus assignable buttons and a slider for hands-on control. Though the Keystation line is class compliant and features true plug-and-play operation under Windows XP and Mac OS X, we recommend that you spend a few minutes reviewing this manual to learn about proper operation, advanced functionality, and programmability.

Product Features

Ports:

- MIDI out
- USB MIDI in/out

Power:

- USB power
- DC in for external PSU

Keyboard:

- 49, 61, 88-note velocity-sensitive keyboard
- Pitch bend wheel
- Modulation wheel
- Volume/Control slider
- Sustain foot pedal input
- Octave +/- buttons
- Advanced Functions button

What's in the Box?

Your M-Audio Keystation package should contain the following items:

- M-Audio Keystation USB keyboard
- User Manual
- USB cable

If any of the above listed items are missing, please contact the retailer where you purchased the product.

About the Manual

This instruction manual covers the operation of the Keystation 49e, 61es, and 88es USB keyboards. Though this manual does not provide a detailed explanation of how to set up your keyboard for use with third-party music software, the majority of music software applications will work seamlessly with the Keystation keyboards. Please consult your software application's manual for additional information.

Connecting Your Keyboard

You can power the keyboard either via a powered USB port or an optional external power supply. The Keystations are low-power devices and an external power supply should not be necessary. It is recommended that you connect the Keystation to an onboard USB port or to a powered USB hub.

Power and Connection Via USB

1. Check that the on/off button on the back of the unit is set to "OFF."
2. Plug the USB cable provided with your Keystation keyboard to a free USB port on your computer.
3. Plug the other end of the USB cable to the USB input on the Keystation keyboard.

The single USB cable not only powers the keyboard but also sends MIDI data to and from your computer system.

Using an External Power Supply

You can also use a power adapter (not included) with the following specification: 9V DC output, 250- 300mA, center positive.

Make sure you are not already powering the Keystation via USB—if you are receiving power from the USB hub, no external supply is needed. If not, then simply plug the power supply in to the "DC 9V" input and switch the power on.

Note: Do not leave the adapter plugged in for long periods of time if the unit is not in use.

Windows XP and Mac OS X

If you are using Windows XP or Mac OS X, you can now simply move the keyboard's power switch to the "ON" position. Because the Keystation line of keyboards is class compliant, the unit will work without any further installation.

Other Operating Systems

If you are using an operating system other than Mac OS X or Windows XP, please refer to our website at www.m-audio.com for the latest Keystation drivers for Macintosh or Windows operating systems.

Installation in Mac OS 9

If you do not have OMS installed, please run the OMS installer first. Otherwise, start by "Installing the OMS Driver."

Installing OMS:

Make sure that all programs are shut down before you begin the installer. Also, make sure you have removed any dongles or copy protection devices you may be using.

1 Insert the Keystation Installer CD-ROM.
2. Double click on the Keystation (49e, 61es, or 88es) Installer CD icon on your desktop
3. Double click on the OS 9 folder.
4. Double click on Install OMS 2.3.8
5. Follow the onscreen instructions
6. It will now take a few moments to install OMS. When it has finished, it will ask you to restart the computer. Click "Restart."

Installing the OMS driver

1. Click and drag the USB Drivers Installer to the desktop from the OS 9 window it resides in.
2. Double click on the icon. If a window appears, click "Open."
3. Double click on the newly created USB Drivers Installer on your desktop.
4. Click "Install." (The installer automatically places the drivers in the correct system folders.)
5. Once the installer has finished installing the drivers, click "Restart."
6. Once your computer has restarted, switch on the Keystation.

OMS Setup

You now have to run the OMS Setup program:

1. Open the Hard Drive > Opcode folder > OMS Applications folder > OMS Setup.
2. If you get a message to switch AppleTalk on or off, you may choose either option, as this will not affect the OMS Setup.
3. In the next window, click "OK."
4. Click "Search."

5. Click "OK."
6. Click "OK" again.
7. Click "Save."
8. If asked, click "Replace."

You should now have a final window showing your current Studio Setup. If "QuickTime Music" is crossed out, double click on it, and then click in the "on" circle to enable it. Then click "OK." Now you're ready to go. Just make sure your Keystation keyboard is selected as the MIDI input in your music software.

Installation in Windows 98 or ME

1. Power up your PC.
2. Insert the Keystation Installer CD-ROM in your computer's CD-ROM tray. Open "My Computer" or Windows Explorer to locate your CD-ROM drive. Click on the folder labeled "Keystation (49e, 61es, or 88es)."
3. Open the Keystation (49e, 61es, or 88es) folder and click on the installer icon.
4. Follow the onscreen instructions.
5. When finished, exit the setup.
6. Switch on the Keystation.

Windows will proceed with the installation of a USB driver and a MIDI driver. Once completed, you are ready to go. Windows may ask you to restart your computer, in which case click "Restart."

Installation in Windows 2000

1. Power up your PC.
2. Insert the Keystation Installer CD-ROM.Open My Computer or Windows Explorer to locate your CD-ROM drive. Click on the folder labeled "Keystation (49e, 61es, or 88es)."
3. Open the Keystation (49e, 61es, or 88es) folder and click on the installer icon.
4. Follow the instructions on your screen.
5. When finished, exit the setup.
6. Switch on the Keystation keyboard. Windows will automatically recognize the keyboard and ask for the Keystation 61es Installer CD-ROM.
7. Select the CD-ROM drive and click "OK." Windows will ask you to select the CD-ROM drive again for the MIDI driver.
8. If Windows reports the drivers have not been digitally signed, click on "Continue Installation."
9. Select the drive once more.
10. Click "OK."
11. In the event that Windows asks you to restart your computer, click "Restart."

Getting Started

Once you have finished installation you will need to configure your MIDI application software to use the Keystation. Please note that when you press a key on the keyboard, you will not hear any sound. This is because pressing a key causes the keyboard to send out MIDI data. MIDI data gives instructions on how a sound should play, but in order to actually hear that sound you need to configure your music software to read the MIDI data being sent from the Keystation and play the sound back accordingly. This setup will more than likely entail going into an Options or Device Set-Up menu in your music software application and selecting the appropriate device. The Keystation should appear under the name "USB Audio Device" for Windows XP or as "Keystation (49e, 61es, or 88es)" for other Operating Systems in the MIDI devices section of your music software application. Please consult the manual that came with your software for the proper set up procedure.

Key Names

Each white key on the Keystation is labeled with a letter and a number. The letter represents the note played and the number represents the octave (the definition of "octave" is given in the next section).

Although the black keys are not labeled, they also have names ("F# 4" or "Eb2" are examples of black key names).

If the name of a black key contains a "#" sign, it is referring to the black key above the same note white key. For example, "F# 3" refers to the black key above F3. If the name of a black key is expressed with a "b" sign, it is referring to the black key below the same note white key. For example, "Eb3" refers to the black key below E3. As a result, the black key between C3 and D3 is both C# 3 and Db3.

Octave Buttons

An octave contains 12 notes. Each octave is denoted on your Keystation by black and white sections starting on C. Each octave is given a number.

If you press the octave "+" button once, the LED above the octave "-" button will go out, indicating the keyboard's octave is now shifted up. If you press the octave "+" key again, you will shift one more octave up, and so on. It is possible to shift the keyboard up 3 octaves or down 3 octaves from 0 octave shift.

To shift the octave down, press the octave "-" button and notice that the led above the octave "+" goes out. If only the led above the octave "-" key is lit, the octave is shifted down and, if only the led above the octave "+" key is lit, the octave is shifted up.

To return the octave shift to 0, press both the octave "+" and "-" keys together. Both LEDs will light, indicating that the octave shift has returned to 0.

The Pitch Bend Wheel

As the name indicates, the assignable pitch bend wheel is primarily used to bend the notes played on the keyboard up or down. This allows you to play phrases not normally associated with keyboard playing, such as guitar-style riffs.

Your sound source determines how far you can bend the note. The usual setting is two semitones, but it can be up to two octaves +/-.

The Modulation Wheel

The modulation wheel is typically used for modulation of the sound you are playing. This type of real-time controller was originally introduced on electronic keyboard instruments to give the performer options such as adding vibrato, just like players of acoustic instruments do.

Just like the pitch bend wheel, the modulation wheel is fully MIDI assignable.

The Volume Slider

The Volume Slider sends a MIDI message that controls the volume of the notes you are playing.

The Volume Slider can also be assigned to different effects such as pan (balance), attack, reverb, chorus and many more. (See "Advanced Functions" for more information.)

Using with a Foot Pedal

A foot pedal can be used for sustaining the sound that you are playing, without having to keep your hands on the keyboard (just like the sustain pedal on a piano).

You can plug a foot pedal of any polarity, sold separately, into the foot pedal input on your M-Audio keyboard. The keyboard will automatically detect the correct polarity when powering up. If you want to reverse the polarity, simply depress the pedal when you switch on your keyboard.

The Advanced Functions Button

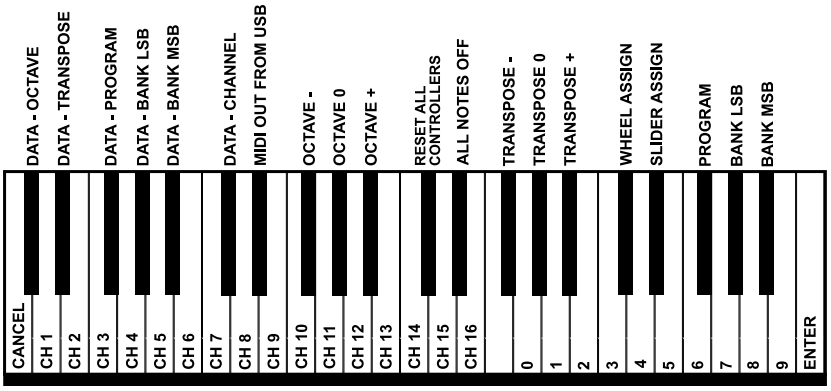
The Advanced Functions button is used to access all the advanced functions of the keyboard that are located on the keybed.

When the Advanced Functions button is pressed, the keyboard goes into "Edit Mode." In Edit Mode, the keys on the keyboard are used for selecting functions and entering data.

The light above the Advanced Functions button indicates whether or not Edit Mode is engaged. In Edit Mode, the black keys on the keyboard are used for selecting functions, while the white keys are used for data entry and channel selection.

Your keyboard will slip out of Edit Mode as soon as a function is selected, or the CANCEL or ENTER keys are pressed (the light above the Advanced Functions button will turn off). The keyboard can then be used to play notes again.

The following diagram shows what each key on the keyboard represents in Edit Mode:



Advanced Functions

In addition to setting an octave shift, the two octave "+" and "-" buttons discussed earlier in the manual under the section "Octave Buttons" can also be used to control one of five MIDI functions.

In the diagram above, you will see that the first 6 black keys are labeled "DATA = _____." These keys are used to select the function of the octave buttons. Some of the functions that these keys can be used for cannot send out a value less than 0. When used to control these functions, both lights above the buttons will remain on, regardless of the current setting of that function.

To select an alternate function:

- Press the Advanced Functions button, putting the keyboard into Edit Mode.
- Press the black key that represents the function you want. Edit Mode will finish as soon as you have selected the function and you will be able to play notes again.

The five available alternate functions of the octave buttons are described below:

Octave Shift

The Octave "+" And "-" Keys

Another method of shifting the Keystation octaves is with the use of the keys labeled octave "+" and "-." After the Advanced Function button has been pressed, placing the keyboard in Edit Mode, pressing these keys will shift the keyboard's pitch up or down one or more octaves (one for each time pressed). The default octave shift designation is "0" and will be the octave setting each time you power up the keyboard. The lights above the octave buttons indicate that 0 octave shift is set when both are on.

To assign the "+" and "-" keys to control the octave:

- Press the Advanced Functions button to get the keyboard into Edit Mode.
- Press the black key above C1 (named C# 1), representing DATA = OCTAVE. Edit Mode will finish as soon as C# 1 has been pressed.

There is also a method of performing a quick octave change, which can be useful when using the octave buttons to control another MIDI function. This is accomplished as follows:

- Press the Advanced Functions button to put the keyboard in Edit Mode.
- Press the black key below B2 (Bb2)—in Edit Mode, this key functions as "OCTAVE +", increasing the octave by 1 (you may press it again to increase the octave by 2, and so on).
- Press the black key above F2 (F# 2)—in Edit Mode, this key functions as "OCTAVE -", decreasing the octave by 1 (you may press it again to decrease the octave by 2, and so on), OR, you can press the black key above G2 (named G# 2)—in Edit Mode, this key functions as "OCTAVE 0" to reset the octave shift to 0.
- When you have chosen your octave shift press C5, representing "ENTER," to leave Edit Mode.

Transposition

In some cases it may be useful to reduce or increase the pitch by a number of semitones rather than an entire octave. For example, if you are playing a song with a singer that is having difficulty hitting the top notes, you may want to reduce the pitch by one or two semitones.* This is achieved using a MIDI function called "Transpose."

Transpose works in the same way as Octave Shift above, except the shift is +/- 12. As with Octave Shift, there are two ways of transposing the keyboard. You can use the Octave "+" and "-" buttons, or the black keys F# 3, G# 3 and Bb3. These black keys represent "TRANSPOSE -," "TRANSPOSE 0" and "TRANSPOSE +," respectively.

To assign the Octave "+" and "-" buttons to transpose:

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above D1 (named D# 1), representing "DATA = TRANSPOSE." (Edit Mode will disengage as soon as D# 1 has been pressed.)
- Press the "+" key and you will hear the pitch of the note you play go up.
- Press both "+" and "-" together to cancel transpose.

*A semitone represents the change in pitch from one note to another. Therefore, changing two semitones is the same as playing a note two notes higher.

Channel

MIDI data from the keyboard can be sent on any of 16 MIDI Channels. However, certain MIDI devices and MIDI software applications require the keyboard to send data on a specified channel. If this is the case, you can change the channel the data is sent using the following method:

- Press the Advanced Functions button to engage Edit Mode.
- Press one of the 16 Channel keys from D1 to E3, according to the Channel that you need.

For example, if a device specifies that you need to send data on Channel 10, press the Advanced Functions button, and then key F2 to select Channel 10.

The Channel can also be assigned to the Octave "+" and "-" buttons. Once assigned, pressing "+" or "-" will increase or decrease the channel incrementally. When Channel 16 is reached and "+" is pressed, Channel 1 will be selected. If the Octave "+" and "-" keys are selected to vary the Channel, the lights above the buttons will not change, since it is not possible to have a Channel with a negative value. Pressing both the "+" and "-" buttons together will recall Channel 1.

Program Change

Program Changes are used to change the instrument or voice you are using. For the sake of example, we will change the instrument to a bass sound. To do this we need to send a program change of 32, which will select an acoustic bass sound from the General MIDI Instruments list in the Appendix. There are two ways to send a program change:

1. Incremental/Decremental Program Change:

- Press the Advanced Functions button.
- Press the black key above F1 (named F# 1).
- Now the Octave "+" and "-" keys can be used to change the program.
- Press "+" and continue to play notes until you find the instrument you want.

2. Quick Select Program Change:

- Press the Advanced Functions button.
- Press the black key above F4 (named F# 4), representing "Program."

Press keys C4, then E3 then C5. This enters the combination: "3," "2," "ENTER." Alternatively, you can use the "+" and "-" buttons to change the value, then press ENTER. Now the keyboard will play a bass sound: Number 32 as listed in the General MIDI Instruments list.

The first method is useful if you want to cycle through different instruments to see which sounds best in your song. The second is more useful if you want to select a specific number, as is the case here.

If the Octave "+" and "-" keys are selected to vary the Program number (Method 1), the lights above the buttons will not change, since it is not possible to have a Program with a negative value. Pressing both the "+" and "-" buttons together will recall Program 0, which selects a grand piano sound.

The full list of instruments that can be accessed via Program Changes is listed in the Appendix at the end of this manual.

Bank LSB and Bank MSB

Program Changes are most commonly used to change instruments and voices. However, the number of instruments accessible via Program Changes is limited to 128. Some devices have more than 128 voices and require a different method to access these extra voices. Generally, these devices use Bank LSB and Bank MSB messages.

1. Incremental/Decremental Bank LSB and Bank MSB Changes:

- Press the Advanced Functions button.
- Press the black key above G1 (named G# 1).
- Now the Octave "+" and "-" keys can be used to change the program.
- Press "+" and continue to play notes until you find the instrument you want.

2. Using the Quick Select Method:

- Press the Advanced Functions button.
- Press the black key above G4 (named G# 4), or A4 (named A# 4), representing Bank LSB or Bank MSB respectively.
- Press keys C4, then E3 then C5. This enters the combination: "3," "2," "ENTER."

Alternatively, you can use the "+" and "-" buttons to change the value, and then press "ENTER."

As with Program Change, if the Octave "+" and "-" keys are selected to vary the Bank LSB or MSB number (Method 1), the lights above the buttons will not change, since it is not possible to have a Bank with a negative value. Pressing both the "+" and "-" buttons together will recall Bank 0.

The Modulation Wheel

It is possible to assign MIDI effects to the Modulation Wheel. Some useful effects are:

- 01 Modulation
- 07 Volume
- 10 Pan (balance)
- 05 Portamento

There are 131 effects in total. However, for these effects to have any affect on the sound, the receiving MIDI device must be able to read and respond to these MIDI effect messages. Most devices will at least respond to volume, modulation, and pan data. (The full list of effects is given at the back of this manual.)

To assign an effect to the Modulation Wheel:

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above C4 (named C# 4), representing "WHEEL ASSIGN."
- Use the Numerical Data Entry keys G3-B4 to enter the number of the effect you want to assign to the Modulation Wheel.

Alternatively, you can use the "+" and "-" buttons to change the value.

- Press the ENTER key (C5).
- Move the Modulation Wheel upwards to increase the value of the effect.

If you have made an error while entering the numerical data value, you can press the CANCEL key (C1) to exit Edit Mode without changing the effect assigned to the Modulation Wheel.

Note that each time the keyboard is turned off, the data assigned to the Modulation Wheel will be lost. Each time the keyboard is powered up, the Modulation Wheel will be assigned to modulation (effect number 01) by default.

For the sake of example, we will assign effect number 10 (pan, or balance) to the Modulation Wheel.

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above C4 (named C# 4), representing "WHEEL ASSIGN."
- Press A3 to enter "1."
- Press G3 to enter "0" so you have entered "10."
- Press C5 for "ENTER."

The Volume Slider

As with the Modulation Wheel, the Volume Slider can be assigned to any of the 131 effects listed at the end of this manual.

To assign the Volume Slider to an effect:

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above D4 (named D# 4), representing "SLIDER ASSIGN."

Use the Numerical Data Entry keys G3-B4 to enter the number of the effect you want to assign to the Volume Slider.

Alternatively, you can use the "+" and "-" buttons to change the value.

- Press the ENTER key (C5).
- Move the Volume Slider upwards to increase the value of the effect.

If you have made an error while entering the numerical data value, you can press the "CANCEL" key (C1) to exit Edit Mode without changing the effect assigned to the Volume Slider.

Note that each time the keyboard is turned off, the data assigned to the Volume Slider will be lost. Each time the keyboard is powered up, the Volume Slider will be assigned to volume (effect number 07) by default.

Pitch Bend Sensitivity

It is possible to alter the sensitivity of the Pitch Bend Wheel by assigning effect number 128 to the Modulation Wheel or Volume Slider. This will allow you to alter the pitch bend range up to one octave up and down.

Troubleshooting MIDI Functionality

The Keystation keyboards have been designed to make working with MIDI on your computer as simple as possible. Nonetheless, you may still experience some difficulties. In many cases, the keyboard is not at fault; the problem lies with the receiving device. To counter this, there are two useful MIDI functions:

All Notes Off

If you find there are hanging notes that you cannot stop playing, send an "All Notes Off" MIDI message by performing the following:

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above D3 (named D# 3), representing "ALL NOTES OFF."
- Edit Mode will disengage, eliminating any hanging notes.

Reset All Controllers

If you find there is an effect on a voice that you do not want, rather than having to isolate and identify that effect, you can send a "Reset All Controllers" MIDI message by performing the following:

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above C3 (named C# 3), representing "RESET ALL CONTROLLERS."
- Edit Mode will disengage, eliminating all effects.

MIDI Out

The MIDI Out port is located on the back of the keyboard, and can be used to connect the keyboard to an external sound module or MIDI keyboard. By default (when you switch the unit on), all controller data is sent out via the MIDI output as well as the USB out.

If you want the MIDI output to act like a traditional USB-to-MIDI interface, engage "MIDI Out from USB" mode by carrying out the following:

- Press the Advanced Functions button to engage Edit Mode.
- Press the black key above D2 (named D# 2), representing "MIDI OUT FROM USB."
- Edit Mode will disengage.

The keyboard is now able to send data received from the computer via its MIDI OUT jack to whatever device is connected.

In order to use the MIDI output, select the Keystation USB MIDI Out as the MIDI output device in your sequencer.

General Troubleshooting

Here are answers to common questions you may have, using your Keystation keyboard:

Problem 1: My M-Audio hardware suddenly stopped working after having performed fine since installation.

Solution 1: Switch off the unit and let it sit for 10 seconds. Then restart your computer and try again. If the problem persists you may have to reinstall drivers for the unit.

Problem 2: I have plugged a sustain pedal into my M-Audio keyboard, but it works the wrong way around.

Solution 2: The polarity of the sustain pedal is calculated by the keyboard when it is powered up. On power up, the sustain pedal is assumed to be in the OFF position. So if you want the sustain pedal to be off when it is not depressed, make sure the pedal is not depressed when you power up.

Problem 3: When I press a key, there is a delay before I hear any sound.

Solution 3: This delay is known as latency. Latency with MIDI signals is due to the software application you are using. MIDI data is simply control data. The MIDI data is read by your software. The software then completes a large number of complex calculations in order to produce the sound you hear–all this takes time.

We strongly recommend a proper soundcard. Refer to www.m-audio.com for a selection of USB, PCI and FireWire audio cards. If you already have an adequate sound card, try reinstalling the latest drivers for the sound card, or try reducing the buffer sizes of the audio drivers.

Contact M-Audio

If you have any questions, comments or suggestions about this or any M-Audio product, we invite you to contact us by using the following information:

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Warranty Info

Warranty Terms

M-Audio warrants products to be free from defects in materials and workmanship, under normal use and provided that the product is owned by the original, registered user. Visit www.m-audio.com/warranty for terms and limitations applying to your specific product.

Warranty Registration

Thank you for registering your new M-Audio product. Doing so immediately both entitles you to full warranty coverage and helps M-Audio develop and manufacture the finest quality products available. Register online at www.m-audio.com/register to receive FREE product updates and for the chance to win FREE M-Audio gear.

Technical Info

Caution: Electro Static Discharge, Electrical Fast Transient and Conducted RF interference may cause the unit malfunctioning. In such case, unplug the unit and plug it in again to restore normal operation.

Note: Your M-Audio Keystation keyboard has been tested to comply with FCC Standards FOR HOME OR OFFICE USE. Modifications not authorized by the manufacturer may void users authority to operate this device.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/ TV technician for help.

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Appendices - Useful MIDI Data

Appendices - Useful MIDI Data

Appendix A - General MIDI Instruments

Piano	Bass	Reed	Synth Effexts
0 Acoustic Grand Piano	32 Acoustic Bass	64 Soprano Sax	96 SFX Rain
1 Bright Acoustic Piano	33 Fingered Bass	65 Alto Sax	97 SFX Soundtrack
2 Electric grand Piano	34 Electric Picked Bass	66 Tenor Sax	98 SFX Crystal
3 Honky Tonk Piano	35 Fretless Bass	67 Baritone Sax	99 SFX Atmosphere
4 Electric Piano 1	36 Slap Bass 1	68 Oboe	100 SFX Brightness
5 Electric Piano 2	37 Slap Bass 2	69 English Horn	101 SFX Goblins
6 Harpsichord	38 Syn Bass 1	70 Bassoon	102 SFX Echoes
7 Clavinet	39 Syn Bass 2	71 Clarinet	103 SFX Sci-Fi
Chromatic Percussion	**Strings/Orchestra**	**Pipe**	**Ethnic**
8 Celesta	40 Violin	72 Piccolo	104 Sitar
9 Glockenspiel	41 Viola	73 Flute	105 Banjo
10 Music Box	42 Cello	74 Recorder	106 Shamisen
11 Vibraphone	43 Contrabass	75 Pan Flute	107 Koto
12 Marimba	44 Tremolo Strings	76 Bottle Blow	108 Kalimba
13 Xylophone	45 Pizzicato Strings	77 Shakuhachi	109 Bag Pipe
14 Tubular bells	46 Orchestral Harp	78 Whistle	110 Fiddle
15 Dulcimer	47 Timpani	79 Ocarina	111 Shanai
Organ	**Ensemble**	**Synth Lead**	**Percussive**
16 Drawbar Organ	48 String Ensemble 1	80 Syn Square Wave	112 Tinkle Bell
17 Percussive Organ	49 String Ensemble 2	81 Syn Sawtooth Wave	113 Agogo
18 Rock Organ	50 Syn Strings 1	82 Syn Calliope	114 Steel Drums
19 Church Organ	51 Syn Strings 2	83 Syn Chiff	115 Woodblock
20 Reed Organ	52 Choir Aahs	84 Syn Charang	116 Taiko Drum
21 Accordion	53 Voice Oohs	85 Syn Voice	117 Melodic Tom
22 Harmonica	54 Syn Choir	86 Syn Sawtooth Wave	118 Syn Drum
23 Tango Accordion	55 Orchestral Hit	87 Syn Brass & Lead	119 Reverse Cymbal
Guitar	**Brass**	**Synth Pad**	**Sound Effects**
24 Nylon Acoustic	56 Trumpet	88 New Age Syn Pad	120 Guitar Fret Noise
25 Steel Acoustic	57 Trombone	89 Warm Syn Pad	121 Breath Noise
26 Jazz Electric	58 Tuba	90 Polysynth Syn Pad	122 Seashore
27 Clean Electric	59 Muted Trumpet	91 Choir Syn Pad	123 Bird Tweet
28 Muted Electric	60 French Horn	92 Bowed Syn Pad	124 Telephone Ring
29 Overdrive	61 Brass Section	93 Metal Syn Pad	125 Helicopter
30 Distorted	61 Syn Brass 1	94 Halo Syn Pad	126 Applause
31 Harmonics	62 Syn Brass 2	95 Sweep Syn Pad	127 Gun Shot

Appendix B - Standard MIDI Controller Numbers (MIDI CC's)

00	Bank Select
01	Modulation
02	Breath Control
03	Controller 3
04	Foot Control
05	Porta Time
06	Data Entry
07	Channel Volume
08	Balance
09	Controller 9
10	Pan
11	Expression
12	Effects Controller 1
13	Effects Controller 2
14	Controller 14
15	Controller 15
16	Gen Purpose 1
17	Gen Purpose 2
18	Gen Purpose 3
19	Gen Purpose 4
20	Controller 20
21	Controller 21
22	Controller 22
23	Controller 23
24	Controller 24
25	Controller 25
26	Controller 26
27	Controller 27
28	Controller 28
29	Controller 29
30	Controller 30
31	Controller 31
32	Bank Select LSB
33	Modulation LSB
34	Breath Control LSB
35	Controller 35
36	Foot Control LSB
37	Porta Time LSB
38	Data Entry LSB
39	Channel Volume LSB
40	Balance LSB
41	Controller 41
42	Pan LSB
43	Expression LSB
44	Controller 44
45	Controller 45
46	Controller 46
47	Controller 47
48	Gen Purpose 1 LSB
49	Gen Purpose 2 LSB
50	Gen Purpose 3 LSB
51	Gen Purpose 4 LSB
52	Controller 52
53	Controller 53
54	Controller 54
55	Controller 55
56	Controller 56
57	Controller 57
58	Controller 58
59	Controller 59
60	Controller 60
61	Controller 61
62	Controller 62
63	Controller 63
64	Sustain Pedal
65	Portamento
66	Sostenuto
67	Soft Pedal
68	Legato Pedal
69	Hold 2
70	Sound Variation
71	Resonance
72	Release Time
73	Attack Time
74	Cut-off Frequency
75	Controller 75
76	Controller 76
77	Controller 77
78	Controller 78
79	Controller 79
80	Gen Purpose 5
81	Gen Purpose 6
82	Gen Purpose 7
83	Gen Purpose 8
84	Portamento Control
85	Controller 85
86	Controller 86
87	Controller 87
88	Controller 88
89	Controller 89
90	Controller 90
91	Reverb Depth
92	Tremelo Depth
93	Chorus Depth
94	Celeste (De-tune)
95	Phaser Depth
96	Data Increment
97	Data Decrement
98	Non-Reg Param LSB
99	Non-Reg Param MSB
100	Reg Param LSB
101	Reg Param MSB
102	Controller 102
103	Controller 103
104	Controller 104
105	Controller 105
106	Controller 106
107	Controller 107
108	Controller 108
109	Controller 109
110	Controller 110
111	Controller 111
112	Controller 112
113	Controller 113
114	Controller 114
115	Controller 115
116	Controller 116
117	Controller 117
118	Controller 118
119	Controller 119

Channel Mode Messages

120	All Sound off
121	Reset all Controllers
122	Local Control
123	All Notes Off
124	Omni Off
125	Omni On
126	Mono On (Poly Off)
127	Poly On (Mono Off)

Extra RPN Messages

128	Pitch Bend sensitivity
129	Fine Tune
130	Coarse Tune
131	Channel Pressure

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